

REMARKS

A total of 47 claims remain in the present application. The foregoing amendments are presented in response to the Office Action mailed February 27, 2006, wherefore reconsideration of this application is requested.

By way of the above-noted amendments, claims 1, 13, 25, 37, 40-41, 44 and 46 have been amended to more clearly define features of the present invention. Claims 39 and 45 have been cancelled in order to avoid redundancy in view of the amendments effected in claims 37 and 44. In preparing the above-noted amendments, careful attention was paid to ensure that no new subject matter has been introduced.

Referring now to the text of the Office Action:

- claims 1-12, and 25-49. stand rejected under 35 U.S.C. § 112 as being allegedly indefinite;
- claims 1, 2, 13 and 14 stand rejected under 35 U.S.C. § 102(e), as being unpatentable over the teaching of United States Patent No. 6,721,304 (Rasanen);
- claims 3-7 and 15-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teaching of Rasanen in view of United States Patent No. 5,175,640 (Eng et al);
- claims 3-7, 15-19, 25-31 and 37-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teaching of Rasanen in view of United States Patent No. 6,185,021 (Fatehi et al);
- claims 25-31 and 37-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teaching of Rasanen in view of United States Patent No. 5,175,640 (Eng et al); and
- claims 8-12, 20-24, 32-36, 39-43 and 45-49 are objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent

form including all of the limitations of the base claim and any intervening claims.

As an initial matter, Applicant appreciates the Examiner's indication of allowable subject matter in claims 8-12, 20-24, 32-36, 39-43 and 45-49. The Examiner's various claim rejections are believed to be traversed by way of the foregoing amendments and further in view of following discussion.

Rejections Under 35 U.S.C. § 112

As to claims 1 and 25, the feature that optical performance variations between the N channels of the link are equalized by averaging within each of the M data signals is described in detail throughout the specification. See, for example, page 15, lines 7-19. Accordingly, it is believed that recitation of this feature in the claims will be clearly understood by a person of ordinary skill in the art.

As to claim 44, Applicant notes that the characteristics of the composite data streams, that is "a substantially equal portion of each one of M parallel data signals, where M is an integer greater than 1, is conveyed through each one of the N channels as a composite data stream" is clearly defined, and provides the only limitation of the composite data streams required for a full understanding of the claimed subject matter. Applicant is of the view that the subject matter of claim 44 does not depend on the precise method used to generate the composite data streams, provided that the composite data streams so made satisfy the claimed limitation.

As to claims 37 and 44, both of these claims have been amended to avoid a single means at the point of invention.

In light of the foregoing, it is believed that the Examiner rejections under 35 U.S.C. § 112 have been traversed.

Rejections Under 35 U.S.C. § 102(e)

United States Patent No. 6,721,304 (Rasanen) teaches methods and systems for high-speed data transmission in a mobile communications network. According to Rasanen, a high-speed EDGE frame is divided into two or more TRAU frames for transmission though respective lower speed transmission channels frame numbering inserted into the TRAU frames enable re-assembly of the original EDGE frames at a receiver end. Thus:

“Each high-speed traffic channel at the radio interface requires two or more lower-rate transmission channels between the base station and the interworking function, which is typically located at the mobile services switching centre. Radio frames, such as EDGE frames, are transmitted over a radio interface traffic channel. Transmission channels are used for transmission of transmission frames, such as TRAU frames. Since each transparent call always has at least two parallel transmission channels via which the transmission frames are transmitted, the base station and the interworking function provide the transmission frames to be transmitted with frame and/or channel numbering which indicates the order of the transmitted frames and/or the transmission channel via which the transmission frame was transferred.” (col 3, lines 26-40)

The person of ordinary skill in the art will recognize this operation as an example of “inverse-multiplexing”, in which a high speed signal is divided into substreams, each of which is transmitted through a lower-speed channel. However, in order for this to work, each high-speed signal must be divided into two or more substreams, which requires that there are at least two transmission channels for each high-speed input signal. This is precisely the arrangement shown in FIGs. 4-6 of Rasanen, in which each high-speed signal is supported by 2 or more lower speed transmission channels.

The person of ordinary skill in the art will recognise that, cast in terms of a system with M data signals and N channels. The system and methods of Rasanen requires that $N \geq 2M$.

In direct contrast, the present invention requires that “each one of M data signals, where M is an integer greater than 1, [are distributed] across the N channels of the link”. Both N and M are integers greater than 1. Thus the present invention contemplates embodiments in which N and M have any integer value greater than 1, and in particular contemplates embodiments in which $N < 2M$. In fact, this later embodiment is explicitly illustrated in FIGs. 2 and 3 of the present application, in which $M=3$ and $N=4$. As such, the present invention contemplates embodiments in which the teaching of Rasanen is entirely inoperative.

In addition, claims 1 and 13 have been amended to define that optical performance variations between each of the N channels are equalized by averaging within each of the M data signals. Rasanen does not teach or suggest optical transmission channels, much less equalization of optical performance differences between such channels.

For at least the foregoing reasons, the presently claimed invention is believed to be clearly distinguishable over the teaching of Rasanen.

Rejections Under 35 U.S.C. § 103(a)

As noted above, Rasanen fails to teach or fairly suggest all of the claimed features of the present invention. None of the known prior art provides the missing teaching. In that respect, Eng et al teach (see FIG. 1) a time-multiplex switch, in which the individual channels (A-L) of a set of input TDMA signals 107-109 can be routed to respective channels of a set of output TDMA signals 110-112. However, Eng et al do not teach or fairly suggest steps of distributing “each one of M data signals, where M is an integer greater than 1, across the N channels of [a] link”, and then “processing the composite data-streams conveyed through the N channels to recover the M data signals”. Nor do Eng et al teach or fairly suggest equalizing optical performance variations between N channels by any means, much less by averaging within each of the data signals.

Similarly, Fatehi et al teaches an optical cross-connect switch. In some embodiments (e.g. FIG. 5), a high-speed input signal can be routed through a lower speed switch fabric by de-interleaving the input signal into substreams which are then independently routed through the switch fabric. The substreams are then interleaved at the output to recover the original high speed signal. The person of ordinary skill in the art will recognize that in the system of Fatehi et al, the interleaving operation is used to re-assemble the original high speed signal. This is an entirely different operation from the presently claimed invention, in which respective portions of different signals are interleaved into a common channel for transmission through the link. Additionally, Fatehi et al do not teach or fairly suggest equalizing optical performance variations between N channels by any means, much less by averaging within each of the data signals.

In light of the foregoing, it is respectfully submitted that the presently claimed invention is clearly distinguishable over the teachings of the known prior art, taken alone or in any combination. Thus, it is believed that the present application is in condition for allowance, and early action in that respect is courteously solicited.

If any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this response, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,

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Date: June 27, 2006

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